

First occurrence of the deepwater shark *Centroscyrnus owstoni* on the Portuguese continental slope

by

Teresa MOURA (1), Ivone FIGUEIREDO (1), Ana NEVES (2), Inês FARIAS (1),
Bárbara SERRA-PEREIRA (1) & Leonel GORDO (2)

RÉSUMÉ. - Premières captures du requin de profondeur *Centroscyrnus owstoni* sur la pente continentale du Portugal.

La présence du requin de profondeur *Centroscyrnus owstoni* est citée pour la première fois sur la pente continentale portugaise. L'espèce présente des caractères morphologiques externes très proches du Pailona commun *Centroscyrnus coelolepis* et a été incorrectement débarquée au Portugal continental sous cette désignation commerciale.

Key words. - Dalatiidae - *Centroscyrnus coelolepis* - *Centroscyrnus owstoni* - ANE - Portuguese continental slope - First record.

Centroscyrnus owstoni Garman, 1906 is a deepwater shark that belongs to the family Somniosidae (Squaliformes). Recently, *C. owstoni* and *C. cryptacanthus* Regan, 1906 have been recognized as single species (Soto, 2001a, 2001b). This species has a wide distribution area, occurring in the Pacific Ocean (Australasia, Southeast Asia and Japan) and in the Atlantic Ocean (Gulf of Mexico, Brazil, Uruguay and also in the SE, in Namibian and South African slopes (Compagno *et al.*, 2005). In the NE Atlantic, it was cited for the Macaronesian Islands (Canary Is.) (González *et al.*, 1993), Azores (Santos *et al.*, 1997) and Madeira (Compagno, 1984)) as *C. cryptacanthus* (Compagno *et al.*, 2005). *C. owstoni* is found on the upper and middle continental slope (Haedrich and Merret, 1988) near the bottom at depths ranging from 420 to 1500 m, being particularly common deeper than 600 m (Compagno *et al.*, 2005).

This species is commercially exploited in the Pacific, particularly in Japan, Australia, and New Zealand, for squalene extraction and fish meal (Yano and Tanaka, 1984).

The most relevant information refers to specimens caught in Japanese waters and in SE Australia, where the species is commercially exploited for squalene extraction and fish meal (Yano and Tanaka, 1984). *C. owstoni* is a viviparous lecithotrophic species, producing about 20-28 oocytes per female. The litter size varies between 16-28 embryos in Japan and 5-13 embryos in SE Australia, while length at birth is estimated as 250 to 320 cm (Yano and Tanaka, 1988; Daley *et al.*, 2002). Males larger than 750 mm are mature while females reach maturity between 1000 and 1049 mm in Japan and around 950 in Australia (Yano and Tanaka, 1988; Daley *et al.*, 2002). This species does not present a well defined breeding season or fertilization period and the duration of the entire reproductive cycle is unknown, although it is accepted that gestation may extend for more than one year (Yano and Tanaka, 1988). Its diet comprises mostly fish and squid (Yano and Tanaka, 1984; Soto, 2001a).

MATERIAL AND METHODS

Four specimens of *Centroscyrnus owstoni* were kept by the fishermen for identification at the IPIMAR. These were caught in November 2006 in the southern Portuguese continental slope, between Cabo Sardão and Arrifana (37°25'N; 09°34'W) at 1470 m deep using bottom longline (Fig. 1). Specimens were stored frozen before identification. Total length, total weight, sex and the distances from the snout to the mouth and from the snout to the gill opening, were recorded.

RESULTS

The sample comprised two females with total lengths of 811 and 715 mm and two males with lengths of 789 and 729 mm (Tab. I). One female and one male were donated to the Natural History Museum of Lisbon (MB4879).

The four specimens presented a dark brown coloration. Their snout was moderately long, with the preoral length as long as the distance from mouth to the first gill opening (Fig. 2). The upper teeth were lanceolate while lower teeth were bladelike with short and oblique cusps. The body did not taper abruptly from the pectoral region. Lateral trunk dermal denticles were smooth and circular, presenting tricuspidate crowns more or less developed (Fig. 3). The

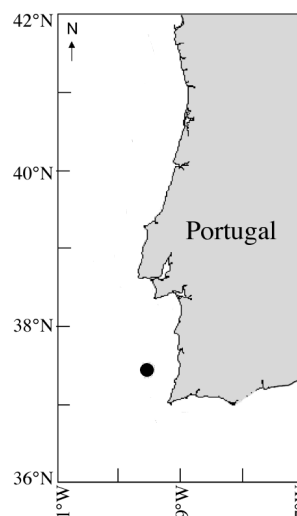


Figure 1. - Geographical location of the occurrence of the four *C. owstoni* on the Portuguese continental slope. [Localisation de la capture des quatre spécimens de *C. owstoni* sur la pente continentale portugaise.]

- (1) Unidade de Recursos Marinhos e Sustentabilidade, Instituto de Investigações Pescas e do Mar (IPIMAR-INRB), Av. Brasília, 1449-006 Lisboa, PORTUGAL. [tmoura@ipimar.pt]
- (2) Departamento de Biologia Animal and Instituto de Oceanografia, Faculdade de Ciências da Universidade de Lisboa, Bloco C2, Campo Grande, 1749-016 Lisboa, PORTUGAL.

second dorsal fin was considerably higher than the first one. The dorsal spines were small but exposed. The second dorsal fin base was longer than the space between it and the origin of upper lobe of the caudal fin. The pectoral fins were moderately large falling, when laid back, well in front of the first dorsal spine.

DISCUSSION

C. owstoni and *C. coelolepis* present great morphological similarities, the second species differing from the first one by having a longer snout, smaller but cuspid denticles, longer and lower first dorsal fin and slightly taller and more triangular second dorsal fin (Compagno *et al.*, 2005). Such similarity between the two species may have resulted in misidentification errors in landing statistics. Landings of the two specimens are mixed together in the landing port of Sesimbra and specimens of *C. owstoni* have been assigned as *C. coelolepis* (recent field observation). Further investigation is needed in order to evaluate the proportion of each species as well as the geographical location of the catches. This identification problem is particularly pertinent in other adjacent areas where the two species coexist due to the weak morphological characteristics used in their differentiation. The recent interest for exploitation of deeper fishing grounds has led to the identification of new species, as well as, new occurrences of already identified species in other areas. The latter is particularly obvious for the cosmopolitan species like *C. owstoni*. At present the conservation status of *C. owstoni* population in Pacific waters is of least concern by International Union for

the Conservation of Nature and Natural Resources (IUCN, 2006 [http://www.iucnredlist.org]). In Atlantic waters there is a lack of biological and stock status information, mainly due to the fact that this species is taken as by-catch from deepwater fisheries targeting other species. The well stated high vulnerability of elasmobranch populations to fishing effort together with their peculiar life strategies, such as, late sexual maturity, low rate of fecundity and of natural mortality and a strong relationship between the number of young and the size of breeding biomass, leads to some concern about the state of Atlantic *C. owstoni* populations.

Acknowledgements. - We thank Henrique Santos, António Jorge and the remaining team of the vessel "Mar e Pesca" and also to the AQUIVARI (Sesimbra) staff for their support with the collection and conservation of the specimens. We also would like to thank Dr Miriam Guerra (IPIMAR) and Dr Louise Hill (IPIMAR) for the revision of the manuscript. T. Moura and B. Pereira were funded by grants from the Fundação para a Ciência e Tecnologia, SFRH/BD/29052/2006 and SFRH/ BDD/23777/2005, respectively.

REFERENCES

- COMPAGNO L.J.V., 1984. - FAO species catalogue. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. *FAO Fish. Syn.*, 125, 4(1): 1-249.
- COMPAGNO L.J.V., DANDO M. & S. FOWLER, 2005. - Sharks of the World. Collins Field Guide. 368 p. London: Harper Collins Publishers.
- DALEY R., STEVENS J. & K. GRAHAM, 2002. - Catch Analysis and Productivity of the Deepwater Dogfish Resource in Southern Australia. Report by CSIRO Marine Research and NSW Fisheries to the Fisheries Research and Development Corporation. FRDC Project 1998/108.
- GONZÁLEZ J.A., SANTANA J.I., JIMÉNEZ S. & F.I. PÉREZ-BARROSO, 1993. - Primera cita de *Nematocarcinus gracilipes* Filhol, 1884 (Crustacea, Decapoda, Caridea, Nometocarinidae) y *Centroscyrnus cryptacanthus* Regan, 1906 (Chondrichthyes, Squalidae) para Canarias. *Bol. Inst. Esp. Ocean.*, 9: 257-259.
- HAEDRICH R.L. & N.R. MERRETT, 1988. - Summary atlas of deep-living demersal fishes in the North Atlantic Basin. *J. Nat. Hist.*, 22: 1325-1362.
- SANTOS R.S., PORTEIRO F.M. & J.P. BARREIROS, 1997. - Marine fishes of the Azores: Annotated checklist and bibliography. *Arquipélago, Life Mar. Sci.*, 28(Suppl.1): 1-241.
- SOTO J.M.R., 2001a. - Contribuição ao conhecimento do tubarão-negro *Centroscyrnus cryptacanthus* Regan, 1906 (Chondrichthyes, Dalatiidae) e a sinonimização de *C. owstoni* Garman, 1906. *Mare Magnum*, 1(1): 27-36.
- SOTO J.M.R., 2001b. - *Centroscyrnus cryptacanthus* Regan, 1906 - A junior synonym of *C. owstonii* Garman, 1906 (Chondrichthyes, Dalatiidae). *Mare Magnum*, 1(2): 172.
- YANO K. & S. TANAKA, 1984. - Some biological aspects of the deep sea squaloid shark *Centroscyrnus* from Suruga Bay, Japan. *Bull. Jpn. Soc. Sci. Fish.*, 50: 249-256.
- YANO K. & S. TANAKA, 1988. - Size at maturity, reproductive cycle, fecundity, and depth segregation of the deep sea squaloid sharks *Centroscyrnus owstoni* and *C. coelolepis*. *Nip. Suis. Gak.*, 54: 167-174.

Table I. - Measurements collected in the four *C. owstoni* specimens captured on the Portuguese continental slope. (n.a. = not available). [Mesures enregistrées pour les spécimens de *C. owstoni* capturés sur la pente continentale portugaise. (n.a. = non disponible).]

	Sp. 1	Sp. 2	Sp. 3 MB 4879	Sp. 4 MB 4879
Total length (mm)	811	789	715	729
Total weight (g)	2094	2740	1785	2205
Eviscerated weight (g)	1819	2126	n.a.	n.a.
Sex	Female	Male	Female	Male
Maturity	1	3	n.a.	n.a.
Snout to mouth (mm)	73	59	55	65
Snout to gill opening (mm)	145	131	110	124



Figure 2. - *Centroscyrnus owstoni* (Female MB4879) caught on the Portuguese continental slope. [*C. owstoni* (Femelle MB4879) capturée sur la pente continentale portugaise]

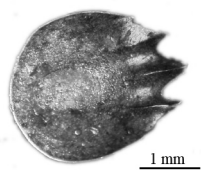


Figure 3. - Trunk dermal denticle of *Centroscyrnus owstoni* caught in the Portuguese continental slope. [Denticule cutané latéral de *C. owstoni* capturé sur la pente continentale Portugaise.]

Reçu le 22 février 2007.

Accepté pour publication le 27 avril 2007.